Executive Summary
The role of this playbook is to address the content acquisition (creation or sourcing) and data aggregation needs of companies at specific stages in their data quality journey.

It includes a high-level architecture of internal and external systems (PIM, internal master data management systems, and ERPs), tools/resources, and the standards needed to support specific data sets. These data sets are aimed to encompass all areas of trade, both business-to-business (B2B) and business-to-consumer (B2C), which includes e-commerce. This playbook will also aim to answer the following questions: what is data quality, who is the responsible party, and what, specifically, do I need to know from a recipient (receiver/buyer) role and/or a supplier/source role?

The answers to these questions serve organizations to help avoid various risks associated with inaccurate product data. They not only help in the B2B world to achieve alignment with trading partners, but also allow the delivery of consistent consumer experiences regardless of delivery channel—strengthening brand awareness and loyalty.

Trading partners define data quality as having consistent, complete, accurate, standards-based, time-stamped data. Trading partners measure product data quality as “electronic data exchanged equals physical data.” Data quality reaches beyond accurate data, encompassing an overall program within an organization that includes executive leadership support, commitment to standards-based data, and processes to validate that consistent, complete, and accurate information is being captured and utilized for both internal processes and external sharing. This provides the foundation for an efficient supply chain and enables trading partner collaboration.¹

For more information and resources, visit the GS1 US National Data Quality Program at www.gs1us.org/dataquality

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Create an internal framework in order to set up the defined roles and responsibilities to support data governance: the data owners, stewards, reviewers, etc. This can be achieved from a department-by-department structure or a company-wide structure to create the centralized point of control.

Ensure stakeholder and subsequent team has a complete understanding of the GS1 System of Standards along with the program focusing on data quality. Once completed, the key learnings can be shared with others within the organization.

Tools & Resources Utilized in the 1st Play

- GS1 Package Measurement Rules
- GS1 GTIN Management Rules
- GS1 US National Data Quality Workshop
- GS1 US National Data Quality Data Governance Best Practice Guidance

Retailer/Recipient Examples

A large regional retailer/recipient is developing a formalized enterprise-wide master data management program for product data. Ownership of new item setup will shift from departmentalized merchandising to a centralized center of excellence.

- Item data specialists will review all data inputs from vendors and data providers, and are accountable for completeness and accuracy of item setup and maintenance.

- Data coordinators provide primary contact points for downstream consumers of the product data within the enterprise, and provide review and approvals of specific data points that drive systems and processes.

- Item data specialists and data coordinators are trained in GS1 Standards, and are accountable for managing product data within standards set by a data governance organization that represents company stakeholders.

Business and validation rules for data acquisition through a vendor portal, and integration with data providers (vendors and data providers), ensure data quality (completeness, consistency, accuracy, standards-based, and timeliness), which can be measured and scorecarded.

Data Governance

1st Play | Organizational Framework

<table>
<thead>
<tr>
<th>Stakeholder/Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person(s)/group with specific interest(s) on particular results of projects and/or actions of an organization.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Steward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person responsible for the management and capability of data elements, both in content and metadata.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Reviewer/Analyst (One-to-Many)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person(s) responsible for inspecting, cleansing, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making actions.</td>
</tr>
</tbody>
</table>
Data Source

2nd Play | Residence & Role of Data

Analyze and consider your data—is it generated from an automatic or a manual process, does it reside solely within a single data source (e.g., ERP, MDM, DAM, Access databases, Excel spreadsheets, flat files, etc.), or does the data need to be created through multiple sources? Data can originate from several sources including external vendors and internal departments.

Without a robust business process in place, the quality of data can deteriorate as it flows through the supply chain. Due to potential cost implications and requests from trading partners, many companies have started to scrutinize their internal processes and education practices with regard to data quality, and perform audits of the information received from and shared among their trading partners. A summary of each system is highlighted below for clarity.

- **Master Data Management (MDM)**: comprises the processes, governance, policies, standards, and tools that consistently define and manage the critical data of an organization to provide a single point of reference.
- **Digital Asset Management (DAM)**: source of digital images, style shots, and product image information.
- **Marketing**: source of marketing information for any given product.
- **Nutritional and Allergen Information**: source of information for any allergen or nutritional statements for the products.
- **Research & Development (R&D)**: system that holds data pertaining to work directed toward the innovation, introduction, and improvement of an organization’s products and processes.
- **Regulations**: source of regulations/compliance affecting product development or product availability.
- **Recipes & Ingredients**: source of product recipes and ingredients.
- **Enterprise Resource Planning (ERP)**: activities assisting organizational management.

**Tools & Resources Utilized in the 2nd Play**

- GS1 US National Data Quality Workshop
- GS1 US National Data Quality Data Governance Best Practice Guidance
- GS1 US National Data Quality Program Framework

**Retailer/Recipient Examples**

Vendor portal will provide a single point of item introduction, with the ability to integrate GDSN®-sourced data, as well as top-off non-GDSN data entered manually. A Product Information Management (PIM) solution provides one source of the truth for all downstream consumers, seamless integration with internal and external sources, and streamlines the item data acquisition, item creation, and item maintenance processes for both supply chain and consumer-facing data. GDSN can continually provide valuable item data maintenance throughout the lifecycle of the product, with a workflow for review/reject/synchronize processes. Integrated business process workflows allow for item maintenance to flow seamlessly, and provide an enterprise-wide view of product data.

**Note**: The term data is referencing both internal data elements that will never be shared outside the organization, as well as the data intended to be shared with trading partners, directly to the consumer, and other external parties.
**Data Creation**

**3rd Play | Mapping Attributes**

*Execute* a mapping exercise of identified attributes to your systems (internal and external data sources) in order to provide a clarified residence for them to ease in data discovery and reconciliation. There may be multiple types of attributes mapped by category, but you may utilize the ones we’ve identified below as examples:

**Step 1** Mapping exercise on systems that reside internally and contain data that either (1) are not transmitted externally or (2) are part of a data creation step in other systems.

**Step 2** GS1 US National Data Quality Program (NDQP) Nine Core Attributes as outlined in Section 7.1 of the GS1 US National Data Quality Program Framework:

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Value(s)/Examples</th>
<th>Data Source (Residence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand Name</td>
<td>Brand X</td>
<td>Marketing</td>
</tr>
<tr>
<td>Declared Net Contents</td>
<td>24 Fl. Oz.</td>
<td>Regulatory, R&amp;D</td>
</tr>
<tr>
<td>Pack Quantity</td>
<td>1</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>GTIN</td>
<td>00614141999996</td>
<td>Marketing</td>
</tr>
<tr>
<td>Linear Dimensions (Height/Width/Depth)</td>
<td>8.245˝/3.125˝/3.125˝</td>
<td>R&amp;D, MDM</td>
</tr>
<tr>
<td>Gross Weight</td>
<td>1.585 Lbs.</td>
<td>R&amp;D, MDM</td>
</tr>
<tr>
<td>Country of Origin</td>
<td>840—US</td>
<td>MDM</td>
</tr>
<tr>
<td>TI-HI</td>
<td>20-010</td>
<td>R&amp;D, MDM</td>
</tr>
</tbody>
</table>

**Step 3** Remaining GS1 Standard attributes that are outlined in the GS1 GDSN Standard or the GS1 US Grocery and Foodservice Attributes Interactive Spreadsheet Tool.

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Value(s)/Examples</th>
<th>Data Source (Residence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Allergen</td>
<td>AP-Peanuts</td>
<td>Nutritionals/Allergens, Recipes</td>
</tr>
<tr>
<td>Food &amp; Beverage Composition</td>
<td>USDA</td>
<td>Nutritionals/Allergens, Recipes</td>
</tr>
<tr>
<td>Type of Nutrient</td>
<td>ENERSF-Calories From Saturated Fat</td>
<td>Nutritionals/Allergens, Recipes</td>
</tr>
</tbody>
</table>

**Step 4** Any other trading partner-specific attributes or attributes that are not part of a standardized format that may be included in the trading partner agreements (e.g., pricing information, recipient portal information, etc.).

**Tools & Resources Utilized in the 3rd Play**
- GS1 US National Data Quality Program Framework
- GS1 US Grocery and Foodservice Attributes Interactive Spreadsheet Tool

**Retailer/Recipient Examples**

A large regional retailer worked through an extensive exercise to identify all required item attribution from across the enterprise to create a draft “Golden Record.” This “Golden Record” will guide vendor requirements, business rules, GDSN requirements, and identification of non-GDSN sources. The “Golden Record” was reviewed against harmonization efforts within the retail grocery and foodservice industry, available GDSN attributes, and the large, regional retailers’ specific data requirements.

**Supplier/Manufacturer Examples**

A large manufacturer provided a breakdown of their data sources:

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Data Source (Residence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand Name</td>
<td>Marketing</td>
</tr>
<tr>
<td>Declared Net Contents</td>
<td>Regulatory, R&amp;D</td>
</tr>
<tr>
<td>Pack Quantity (PQ)</td>
<td>PS, WMS (Warehouse Management System), MDM</td>
</tr>
<tr>
<td>GTIN</td>
<td>MDM</td>
</tr>
<tr>
<td>Linear Dimensions/UOM</td>
<td>MDM</td>
</tr>
<tr>
<td>Gross Weight/UOM</td>
<td>MDM</td>
</tr>
<tr>
<td>Country of Origin (COO)</td>
<td>MDM</td>
</tr>
<tr>
<td>TI-HI</td>
<td>PS</td>
</tr>
</tbody>
</table>

**Note:** For ease of use, this playbook provides clarity and input for the types of attribute data vs. the use case of attribute data. Once the examples have been vetted, the use case scenarios can be utilized for company implementation (i.e., SmartLabel™).
Data Review
4th Play | Ensuring Completeness & Accuracy

Utilize an interdepartmental or standalone lead to serve as the data steward with the purpose of overseeing the work of the department reviewers. The reviewers are to ensure completeness and accuracy of the data before any sharing can commence. Additionally, the reviewers may implement a continuous, ongoing internal audit process to not only ensure the changing of data meets all GS1 Standards updates (along with coinciding with external trading partner agreements), but on an internal pre-determined schedule. Companies that have strong data management programs follow industry best practices for continuity and consistency. These companies have documented processes that are shared throughout the organization.

In the review cycle, if data needs to be changed, removed, or updated the recommendation is to continue to utilize the framework below to vet any changes through the data steward and data reviewers. The recommendation may be the same for interdepartmental or customer data discrepancies.

Tools & Resources Utilized in the 4th Play
- GS1 US National Data Quality Data Governance Best Practice Guidance
- GS1 US National Data Quality Program Framework

Retailer/Recipient Examples
Business and validation rules for data acquisition through a vendor portal, and integration with data providers (vendors and data providers), help ensure data quality (completeness, consistency, accuracy, standards-based, and timeliness), which can be measured and scorecarded. Item data accuracy is ultimately the responsibility of item data specialists and data coordinators. Item data specialists, responsible for new item setup and maintenance, will utilize an established workflow between internal and external sources to ensure data quality standards are met. Integrated business process workflows allow for item maintenance to flow seamlessly, and an enterprise-wide view of product data. Accountability is established in defined roles and permissions.

Note: Although the diagram above may be in a linear fashion, it is important to highlight that there are systems that are reviewed more frequently than others (i.e., marketing data systems may need to be updated more quickly and more regularly than some of the supply chain data systems). Additionally, parts of records within certain systems may need to be updated and verified first, before the whole record, so the data stewards/data reviewers are needed to have full visibility to all systems.
System Review
5th Play | Data Governance Review/Reverse Engineering

Execute an internal data source process (reverse engineering) to see if any errors exist on sourcing and routing of the data. In order to execute this, a “mock” internal data synchronization pilot can be performed to expose those gaps (if any). This can be associated with the work that has been highlighted in the 4th Play, specifically the ongoing review/audit of those attributes. All findings in this step are reported back to the data reviewers and data stewards.

Retailer/Recipient Examples
A large, regional retailer will establish a cadence of accountability within a center of excellence that provides reporting and feedback loops, and an expectation for resolution of any data problems. Data issues can be escalated to the appropriate accountable team/person: vendor, item data specialist, data coordinator, and data governance team.

Tools & Resources Utilized in the 5th Play
- GS1 US National Data Quality Data Governance Best Practice Guidance
- GS1 US National Data Quality Program Framework
Data Deployment
6th Play | Uploading to PIM and/or Certified Data Pool

Deploy to the internal PIM and/or certified data pool per internal deployment mechanisms and certified data pool processes.

- PIM Solution
- GS1 Certified Data Pool

Tools & Resources Utilized in the 6th Play
- GS1 US National Data Quality Data Governance Best Practice Guidance
- GS1 US National Data Quality Program Framework
- GS1 Certified Data Pools

Data Cleanse
7th Play | Validating and Confirming

Begin to implement processes and procedures that provide short term/immediate results on data quality analytics; these can be referred to as “quick-wins.” The positive results attained by this can be vetted throughout the organization that the data quality framework is in place.

Tools & Resources Utilized in the 7th Play
- Inaccurate Package Measurements: A Common, but Preventable Root Cause of Data Quality Problems
  Key considerations to help you adhere to GS1 package measurement rules and safeguard the quality of your product information.

Retailer/Recipient Examples
A PIM solution provides one source of the truth for all downstream consumers, seamless integration with internal and external sources, and streamlines the item data acquisition, item creation, and item maintenance processes for both supply chain and consumer-facing data.

Retailer/Recipient Examples
A large, regional retailer will continue to integrate internal data accuracy initiatives within the new master data management environment, expanding audits from supply chain core attributes to consumer-facing attributes. An internal auditor (responsible for performing physical audits), and the master data team (specialists responsible for B2B relationship, data accuracy, data synchronization, and master data troubleshooting) are responsible for providing detailed vendor accuracy/sync reporting, with the goal of continuous improvement.

- This team is certified on the GS1 Package Measurement Rules, and GTIN Management Standard as part of their defined role, and apply the GS1 Standards to their reporting.
- Audits will broaden from supply chain to consumer-facing attributes, including SmartLabel™ requirements.

Identified data issues are escalated appropriately internally and externally. Validations within the PIM solution may help to provide “common sense” safeguards against “bad data,” while physical audits will provide a more granular view and insight into data discrepancies.
## Data Governance
**Organizational Framework**
Provide a centralized point of control on processes and procedures focusing on the quality of data. Data governance is not purely a technical initiative. Business needs to partner with technology to be successful. Good data governance is a strategy shared between the managers of business and technology.

## Data Source
**Residence & Role of Data**
This is the system (manual or automatic) that is the focal point for the generation of data. It could be one or multiple systems.

## Data Creation
**Mapping Attributes**
This is the act of providing data based on a business process, system process, or product information.

## Data Review
**Ensuring Completeness & Accuracy**
This is the team responsible for ensuring consistent, quality data, such as the data steward, data reviewer, etc.

## System Review
**Data Governance Review/Reverse Engineering**
This is the team responsible for monitoring data communication between systems as it is generated and communicated.

## Data Deployment
**Uploading to PIM and/or Certified Data Pool**
This is the area where the data is communicated out (whether by 1:1 sharing, a PIM solution, and/or utilizing the GDSN) to other trading partners and associations based on those requirements.

## Data Cleanse
**Validating and Confirming**
The process of identifying corrupt or inaccurate data within a system (database or other) and the validation of correcting or deleting such data.
The MDM Solution Framework (Current/Future State)

**Internal Supply-Side Standard Processes**

- Mktg.
- Nut./Alg.
- R&D
- Reg.
- DAM
- ERP
- BI/Analytics
- E-Com
- Other Data

**Internal Demand-Side Standard Processes**

- 3rd Party Data Provider/Aggregator
- GS1 GDSN-Certified Data Pool for Supply Side (Based on GS1 Standards)

**Demand-Side Partner**

- "Top Off" Non-GS1 Standard Data
- Consumer (Consumer-Specific Information)

**GS1 GDSN-Certified Data Pool for Demand Side**

- (Based on GS1 Standards)

**Regulatory Agencies**

- Distributors
- Operators
- Retailers
The PIM Solution Framework (Future State)

Internal Supply-Side Standard Processes

- MDM
- Mktg.
- Nut./Alg.
- R&D
- Reg.
- DAM
- ERP
- BI/Analytics
- E-Com
- Other Data

PIM Solution
- Aggregate multiple data sources
- Mass updates/changes
- Ability to add new attributes
- Ability to generate custom exports

3rd Party Data Provider/Aggregator

GS1 GDSN-Certified Data Pool for Supply Side
(Based on GS1 Standards)

GS1 GDSN-Certified Data Pool for Demand Side
(Based on GS1 Standards)

Internal Demand-Side Standard Processes

- Regulatory Agencies
- Distributors
- Operators
- Retailers

- MDM
- Mktg.
- Nut./Alg.
- R&D
- Reg.
- ERP
- BI/Analytics
- E-Com
- Prvt. Label

- Consumer
(Consumer-Specific Information)

- Demand-Side Partner
“Top Off” Non-GS1 Standard Data

- GDSN

Appendix: The PIM Solution Framework (Future State)